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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Project h-1-22 Date October 20, 1943 Author

SUBJECT—

TITLE

FOREST INSECT SURVEY - SEASON OF 1943

SEQUOIA AND KING'S CANYON NATIONAL PARKS

by

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Berkeley, California
October 20, 1943

INDEX NO.—

U. S. GOVERNMENT PRINTING OFFICE 8—9742

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SEQUOIA AND KING'S CANYON NATIONAL PARKS

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FOREST INSECT SURVEY - SEASON OF 1943

SEQUOIA AND KING'S CANYON NATIONAL PARKS

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FOREST INSECT SURVEY - SEASON OF 1943
SEQUOIA AND KING'S CANYON NATIONAL PARKS

For the past few years insect control reports for the King's Canyon, General Grant and Sequoia National Parks have been based upon brief reconnaissance surveys of the front areas accessible to improved roads. Infestations have been appraised and loss estimates formed from a tally of current insect-killed trees on selected strips and counts of fading and red-topped trees in the watersheds that could be viewed from the roads. Only selected areas comprising a small percent of the total timbered acreage in the Park have been examined. Little is known of forest insect conditions in the back country.

The 1943 survey was made by J. E. Patterson and J. M. Miller on September 14 and 15. A comparison of the conditions found on this survey with those that existed some years back will serve to emphasize the great improvement that has taken place in the pine stands in recent years with respect to bark beetle infestations.

REVIEW OF PREVIOUS SURVEYS AND CONTROL WORK

Surveys.

In the past insect control surveys have been of a more detailed and factual nature than those of the past few seasons. In 1918, a complete loss cruise was made of the Middlefork and Marblefork watersheds of the Kaweah preliminary to control work, and the same areas were thoroughly covered by survey the next year to check results. Little further work was done until 1929 when a rapid increase of bark beetle infestations occurred. At that time Superintendent White assigned to Park Forester Been the responsibility for conducting annual forest insect surveys which were to be followed by control action when necessary. This survey program has been maintained either by National Park or Bureau of Entomology and Plant Quarantine personnel up to the present time, thus making available an annual appraisal of forest insect conditions over a period of fourteen years.

At least two of the past reports have attempted to clarify the considerations that should govern forest insect control in the Sequoia so as to conform with the general policy adopted by the Forestry Office of the National Park Service. In 1930, Been and Miller made a joint survey of the Park and submitted a detailed report 1/ in which they discussed at some length the conditions under which control action should be considered.

1/ Forest Insect Conditions, Sequoia National Park, Season of 1930. J. M. Miller and Frank Been. November 20, 1930.

It was proposed in this report that control work be limited to specific areas where the benefits would apply to the protection of forest cover essential to public use and development of the Park. Such areas are those where the travel is most concentrated, especially camp-ground areas. The areas selected for subsequent surveys and control work have largely conformed with the recommendations of this report.

In 1934, Dr. Donald DeLeon, Entomological Technician for the National Park Service, further outlined the areas to be covered by annual surveys and instituted a method of topographic spotting and estimating which provided the current loss picture in each of the Kaweah watersheds 2/. This system of surveys, however, requires the best of weather conditions for viewing and must be timed so that the maximum of fading and red trees are in evidence. It has not been possible to continue with this system of survey because of the time requirements and lack of available personnel.

Recent conditions compared with past losses.

For the pine type in general the bark beetle infestations in the front areas have been very light during recent years, and 1943 is no exception to this trend. We can gain a good impression of the extent to which the losses in ponderosa and sugar pine have declined by comparing the number of trees killed in 1930, 1933 and 1942, for which loss estimates are available in the Marblefork and Middlefork watersheds of the Kaweah.

	Number of ponderosa pine and sugar pine killed annually.		
	1930	1933	1942
Marblefork	205	165	20
Middlefork	847	1,524	30
Both watersheds	1,052	1,689	50

In actual volume of losses, the decline from the peak in 1933 to the low point in 1942 has been around 90 percent. In the fir type a similar decline has taken place, although not quite so pronounced.

Explanations are at best speculative for the natural causes behind this decline in the cycle of bark beetle infestations, since no studies have been carried on in the Sequoia areas to correlate loss trends with weather or other factors. It is significant, however, that a period of winters of low precipitation occurred at the time

2/ The 1933 Losses of Sugar Pine and Ponderosa Pine in the Sequoia National Park with Recommendations for Control Work for 1934. Donald DeLeon. July, 1934.

the infestations were on the increase, and that the decline has been going on during a period of highly favorable precipitation years. Increased growth vigor of the trees has probably been the dominant factor in their resistance to attack and in weakening the force of bark beetle populations.

Results of control work.

During the epidemic period, the control efforts of the Park Service were effective in holding down the losses of pine in the intensively used Park areas. Several new centers of mountain pine beetle activity which were becoming epidemic in lodgepole pine in 1930-33 were eliminated at Willow Meadow, Clover Meadow, Lodgepole Camp and Hockett Meadows, and thus prevented these infestations from developing into the heavy killings of lodgepole like those which have characterized this beetle in the Crater and Yosemite Parks. Losses of mature sugar pine, ponderosa and Jeffrey pine would have been considerably heavier in the Marblefork and Giant Forest areas had it not been for the control campaign conducted by the National Park Service.

No control work was attempted during the epidemic in the inaccessible fringe areas, and it was here that the heaviest depletion of the pine has occurred. However, the loss of mature pines in these rarely visited areas has had little effect upon their value for National Park uses. The dead snags of trees killed some ten to fifteen years ago are now disappearing from view as they rot and fall. Young pine growth, oak and brush type are maintaining a cover on these sites.

1943 CONDITIONS BY REPORTING AREAS

South Fork of King's River.

The last report on this area was submitted in 1940 3/. The public-use area that was being developed in and around Cedar Grove, where a number of large sugar pine and ponderosa pines had died, was examined in September, 1940, by Miller and Patterson at the request of Dr. Bryant, then acting Superintendent. In the report it was shown that a steady depletion of the pine stands had been in progress on certain sites of the lower canyon floor. This condition was not the result of sporadic bark beetle epidemics, but was primarily a gradual attrition of trees on the drier sites. Although recent losses had declined from those previously measured, they were still formidable and were expected to continue because of the poor growth vigor noted in many of the older trees. Lowering of the water table in the old moraines was suggested as an underlying cause of this continuing deterioration of trees growing on

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3/ Memorandum for Superintendent. Forest Insect Conditions - Southfork of King's River.
J. M. Miller. September, 1940.

these sites. Utilization of the weakened or "high risk" trees was suggested as a control measure from which indirect benefits could be derived.

No change in conditions described in this 1940 report were found in 1943. There are still a great many high risk trees in the camp grounds and on other sites in the lower canyon. A certain number of these trees will continue to die each year. This continuing loss will not be spectacular unless the bark beetles again become epidemic, but it will steadily remove trees where cover is needed. Increasing public use of the camp grounds will probably tend to aggravate conditions unfavorable to tree growth and a return of increasing infestations will almost certainly result in concentration of losses in areas where these weakened "high risk" trees predominate.

The 1943 loss in and around the Cedar Grove camp-ground areas amounted to 13 ponderosa pines and 5 sugar pines. This is an increase over 1940 in number of trees recorded on the camp grounds, where the losses sustained amounted to 6 ponderosa and 7 sugar pines of large diameters. To supplement the 1943 camp-ground examination, a roadstrip was run down the canyon on the highway west from the Cedar Grove bridge. On this strip of 1.2 miles, the loss recorded consisted of 2 sugar pines and 5 ponderosa pines. A series of small photographs were taken during the 1943 survey to illustrate the conditions which have just been described, and these are attached to this report.

Direct control work against this low endemic infestation by the usual methods of cutting and burning the infested trees cannot be expected to materially retard the rate of loss now going on. However, some benefits will come from such work since it is a measure of general camp-ground cleanup and eliminates the hazard of dead snags in areas of intensive public use. If properly timed, it will eliminate the beetles that are breeding on the camp-ground area, but will not prevent beetles from other areas in the canyon being attracted into the susceptible trees.

From an entomological standpoint the best control would be the cutting and removal of the high risk trees while they are still alive and before they become attacked and infested. In commercial pine forests this method, which is referred to as sanitation-salvage, insures full utilization of trees which would otherwise deteriorate rapidly because of bluestains and rots that develop rapidly after the beetles attack.

General Grant Grove.

The principal forest insect problem in this area has resulted from the work of the mountain pine beetle in sugar pine. Control work was started in 1933 under the CCC program and was maintained up until 1940 when a very low endemic infestation was reached. In 1943 the infestation is far below normal. From the Park Ridge lookout only three red-topped trees were visible. A roadstrip along the main highway through the Park recorded only one tree attacked in 1943; it had previously been weakened by lightning.

However, windstorms during the winter of 1942-43 brought down a number of large sugar pines and it is fairly evident that much of the current infestation has been absorbed by the green logs of this windthrown material. Bark beetles nearly always build up their numbers in windfalls the first season after the trees blow down and emerge to attack standing trees the following year. The areas around these windfalls should be watched closely in 1944 and control action taken if there are signs of the infestation becoming aggressive.

Generals Highway.

One Jeffrey pine killed in 1942 was the only evidence of bark beetle infestation along a two-mile roadstrip near Woodward creek. Bark beetle infestations are definitely subnormal in the belt of the forest which this highway traverses.

Lodgepole Camp and Giant Forest.

Both Jeffrey pine and sugar pine losses are negligible in the upper Marblefork basin and in the Giant Forest area. No infestation whatever was found in lodgepole pine on the Lodgepole Camp development area. The lodgepole type at Willow Meadow was not examined on this survey and may contain a few infested trees.

Marblefork.

The only evidence of active bark beetle infestation in the Park was found in the sugar pine - ponderosa pine type of the Marblefork area. Two recently faded groups, each containing three large ponderosa pines killed by the western pine beetle, were found south and west of Beetle Rock; losses in sugar pine caused by the mountain pine beetle have apparently increased over 1942. Two miles of roadstrip on the Colony Mill road recorded only one sugar pine killed in 1942, but a total of 10 sugar pines and 7 ponderosa pines were counted outside of the strip.

This infestation as yet is well below epidemic status and is not sufficiently serious to warrant control action.

Middlefork.

This area was viewed only from Moro Rock in this survey. The impression was gained that the area contained no bark beetle infestation of any consequence.

SUMMARY OF LOSS ESTIMATES FOR REPORTING AREAS

The 1942 report included estimates for the main reporting areas covering the current season of loss and the two preceding years. In order to follow the trends in these areas, estimates for 1943 have been added for comparison with 1941 and 1942. These estimates apply only to trees above 16" D.B.H. and will average above 30 inches except for lodgepole pine.

Reporting Area	Timbered Acreage	Sp.	1941 No. trees	1942 No. trees	1943 No. trees
Generals	20,000	Pine	125	80	50
		Fir	250	180	120
Lodgepole	10,000	L. pine	150	50	50
		Pine	50	20	70
Marblefork	8,000	Fir	180	130	100
Giant forest	6,000	Pine	65	15	15
		Fir	160	140	90
Middlefork	20,000	Pine	40	30	30
		Fir	220	80	50

SUMMARY OF RECOMMENDATIONS

Under the existing endemic bark beetle infestations of 1943, special control projects will not be necessary.

Removal of infested trees as a sanitation and safety measure on camp grounds and other areas of intensive public use should be timed so that the infested bark can be treated before the insects emerge. This will reduce the hazard of attack on other trees in the vicinity.

The number of windthrown trees was well above normal during the winter of 1942-43. This down-material is a source of potential bark beetle infestation which may develop in standing trees in 1944. Areas where windfall damage occurred should be inspected next season; so that if aggressive infestations do occur, they can be controlled promptly.

Removal of decadent trees in the lower valley of the southfork of King's River would materially reduce the hazard of continuing bark beetle infestations in the camp-ground areas.

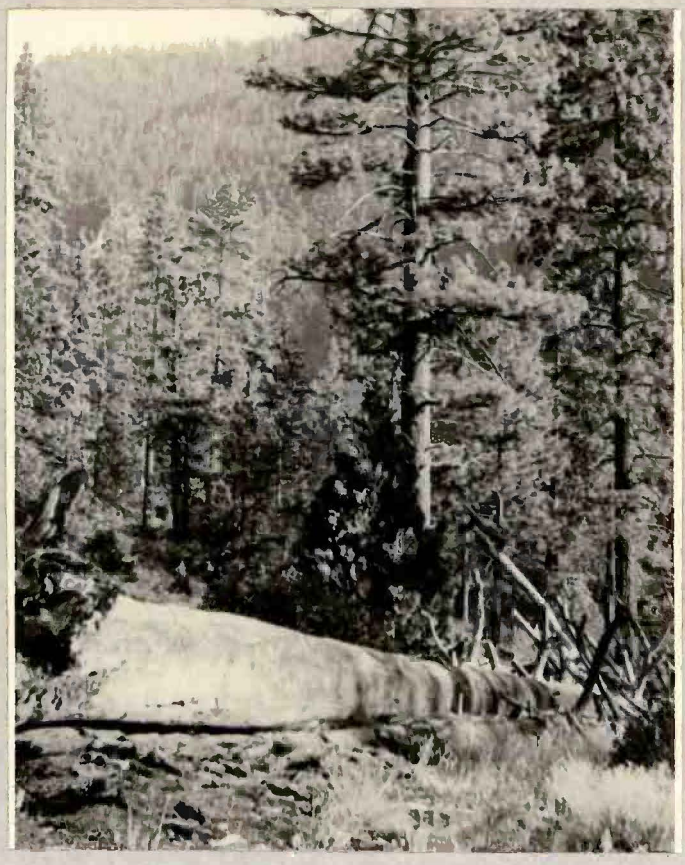
13131A 13131B

GROWTH CONDITIONS ARE BECOMING LESS FAVORABLE FOR PINES IN CERTAIN AREAS OF THE KING'S CANYON FLOOR

From their height and the form of their crowns, these ponderosa pine stands near Cedar Grove apparently grew up under good site conditions. In more recent years growth conditions have become less favorable as indicated by thinning of the foliage and die-back of the crowns. These weakened trees are eventually killed by bark beetles.

The areas that are most seriously affected by this change are the drier sites, particularly the western slopes of the old terminal moraines. Causes may be attributed to a lessening precipitation over a long cycle of years, or to gradual lowering of the underground water supply as the river cuts its channel deeper in the sloping floor of the lower canyon. Whatever the cause, it is of long standing and has already resulted in the loss of a high percent of the stand on these unfavorable sites.

13131C



13131D

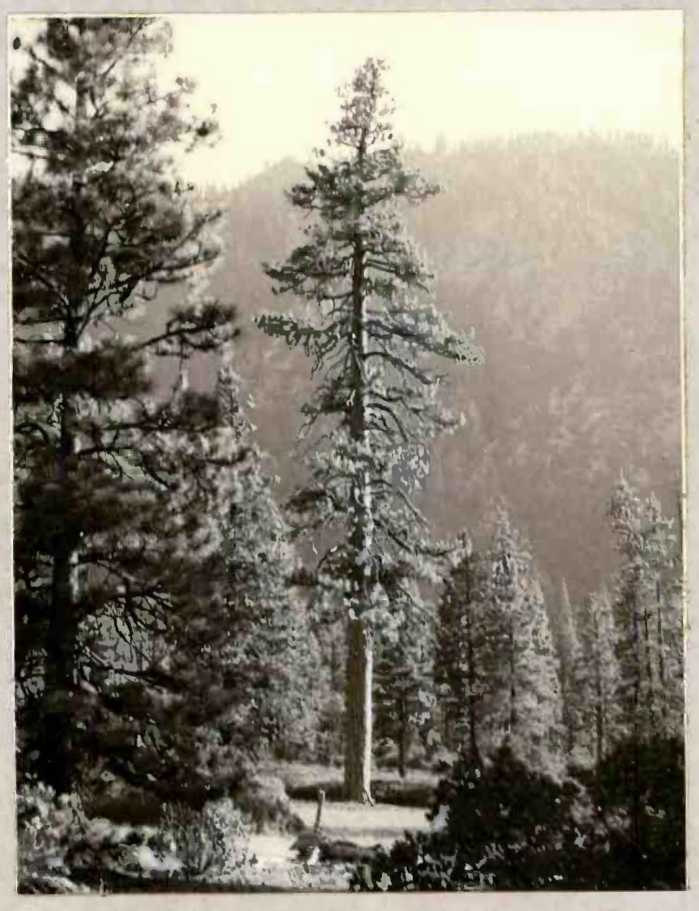
LOSS OF PINES FROM BARK BEETLE ATTACK WAS FIRST BROUGHT TO THE ATTENTION OF THE FOREST SERVICE ABOUT TWENTY-SIX YEARS AGO

In 1917 Ralph Hopping marked out a sample area near Cedar Grove and measured the loss caused by bark beetles in the pine type. In his report, Hopping stated that he first inspected the area in 1913 and that the bark beetle infestation since then had been "continuous and steadily increasing."

One of the infested trees marked by Hopping on the sample plot in 1917 is now a fallen snag. The tree number which he recorded at breast height on the sapwood is still faintly visible. These pictures were taken in September, 1943.

13131E

SITE CONDITIONS DETERMINE THE SURVIVAL OF PINES IN THE CANYON FLOOR

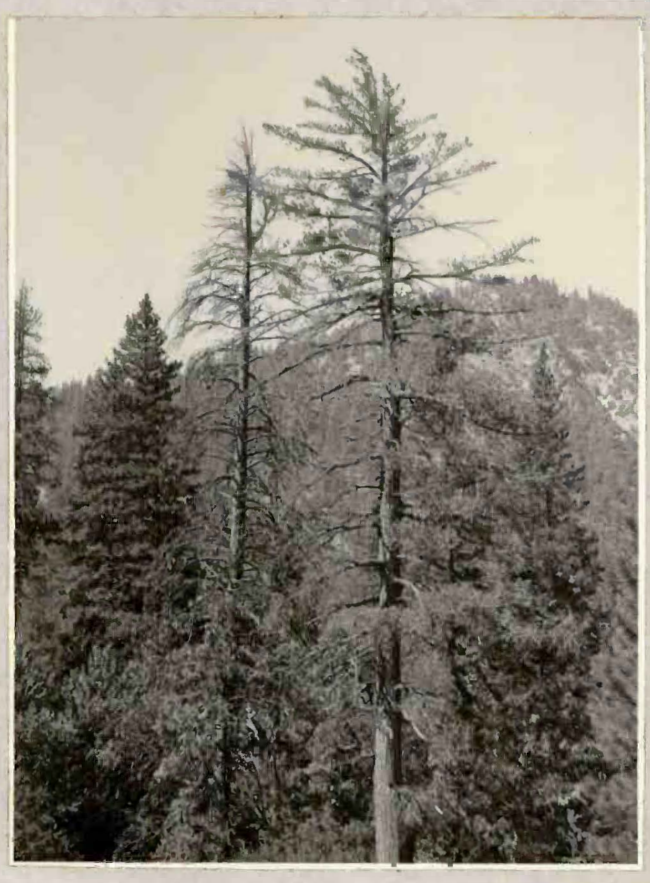


13131F

13131E. Looking down the South Fork canyon above Cedar Grove. The barren foreground is the western slope of a moraine formation through which the river has cut its channel to the right of this picture. Brush cover is taking over where the pine fails to reproduce.

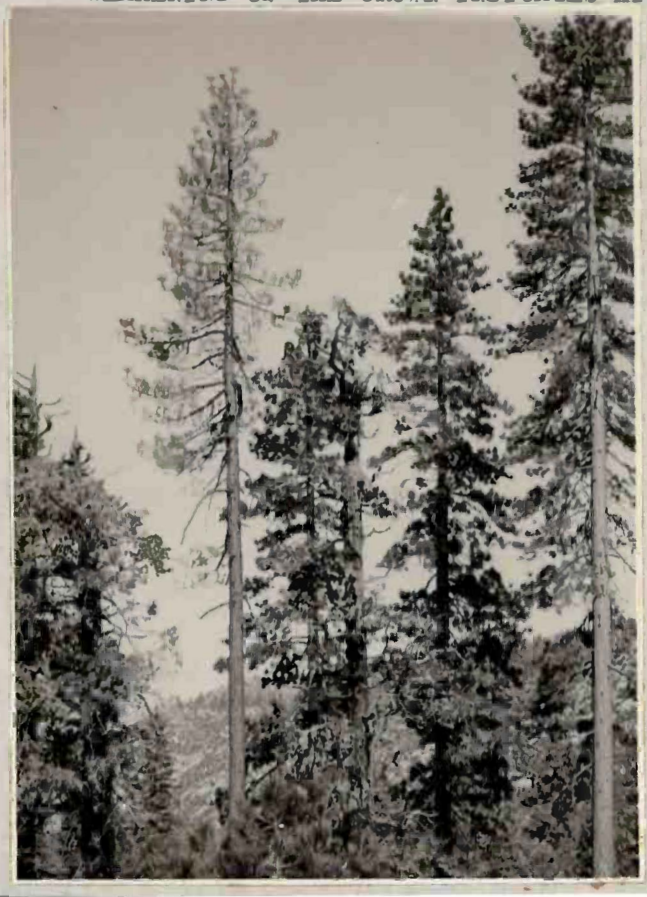
13131F. One of the better sites northeast of Cedar Grove. The large ponderosa pine in the center is a surviving veteran of the mature stand which once occupied this site. The younger trees which are now replacing the old stand that has died out are maintaining satisfactory growth vigor.

13131G



13131H

WEAKENING OF THE CROWN INDICATES HIGH RISK FROM BARK BEETLE ATTACK.



13131I

13131G. A large sugar pine in the Cedar Grove camp grounds which has been gradually dying back in the crown for the past five years.

13131H. Sugar pine in the earlier stages of crown deterioration. A ponderosa pine in the background has already been killed by beetles.

13131I. Jeffrey pine on left has thin foliage, is off color and is definitely "high risk." Its condition contrasts with the vigorous dark green foliage of the tree to the right.

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